In the Claims

1. (Currently amended) A high density plasma processing apparatus generating an inductively coupled plasma that is highly uniform, the apparatus comprising:

a processing chamber providing a hermetically sealed plasma generating space and having a planar surface [on a top wall] thereon;

[a plurality of] first, second and third gas pipes that inject process gases into the processing chamber;

a plurality of loop-shaped antennas installed on the planar surface of the top wall of the processing chamber and connected in parallel with each other;

a resonance antenna coil receiving a high frequency power and including the plurality of loop-shaped antennas and a plurality of variable [capacitor] capacitors that are connected [in parallel] with the plurality of loop-shaped antennas in order to maintain a resonance state therebetween;

an antenna heating device applying a heat exchange medium to the plurality of loop-shaped antennas so as to heat the resonance antenna coil; and

[a means for heating the resonance antenna coil by way of using a heat exchange medium; and]

a means for fixing a substrate inside the processing chamber parallel with the planar surface of the top wall of the processing chamber.

2. (Original) The apparatus according to claim 1, wherein the plurality of loop-shaped antennas of the antenna coil are hollow tubes that have empty spaces thereinside.

3. (Original) The apparatus according to claim 2, wherein the plurality of loop-shaped antennas of the antenna coil are made of silver-coated aluminum (A1).

4. (Original) The apparatus according to claim 2, wherein the means for heating the resonance antenna coil circulates the heat exchange medium into the empty space of the plurality of loop-shaped antennas.

5. (Original) The apparatus according to claim 1, further comprising a heater that supplies heat to the processing chamber.

6. (Currently amended) The apparatus according to claim 1, wherein at least one gas pipe surrounds the means for fixing the substrate in a shape of a ring and the end of the [this] gas pipe bends toward and over the means for fixing the substrate so as to inject the process gases upward.

7. (Currently amended) A high density plasma processing apparatus generating a plasma that is highly uniform, the apparatus comprising:

a processing chamber providing a hermetically sealed plasma generating space and having a trapezoid-sectional shaped top wall with a planar surface [on a top wall] thereon;

[a plurality of] first, second and third gas pipes that inject process gases into the processing chamber;

a plasma electrode receiving a first high frequency power and being installed on the planar surface of the top wall of the processing chamber;

a plurality of loop-shaped antennas installed on a surface of the top wall of the processing chamber except the planar surface and connected in parallel with each other;

a resonance antenna coil receiving a second high frequency power and including the plurality of loop-shaped antennas and a plurality of variable [capacitor] capacitors that are connected [in parallel] with the plurality of loop-shaped antennas in order to maintain a resonance state therebetween;

an antenna heating device applying a heat exchange medium to the plurality of loop-shaped antennas so as to heat the resonance antenna coil; and

[a means for heating the resonance antenna coil by way of using a heat exchange medium;]

a means for fixing a substrate inside the processing chamber parallel with the planar surface of the top wall of the processing chamber.

8. (Original) The apparatus according to claim 7, wherein the plurality of loop-shaped antennas of the antenna coil are hollow tubes that have empty spaces thereinside.

9. (Original) The apparatus according to claim 8, wherein the plurality of loop-shaped antennas of the antenna coil are made of silver-coated aluminum (A1).

10. (Currently amended) The apparatus according to claim 8, wherein [the means for heating the resonance antenna coil] the antenna heating device circulates the heat exchange medium [into] through the empty space of the plurality of loop-shaped antennas.

11. (Original) The apparatus according to claim 7, where the first and second high frequency powers have a high frequency of greater than 1 MHz.

12. (Currently amended) The apparatus according to claim 7, wherein the third [at least one] gas pipe surrounds the means for fixing the substrate in a shape of a ring and the end of the third gas pipe bends toward and over the means for fixing the substrate so as to inject the process gases upward.

13. (New) The apparatus according to claim 10, wherein the heat exchange medium circulating through the plurality of loop-shaped antennas maintains the resonance antenna coil at a temperature of 50 to 100 degrees Celsius (°C).

14. (New) The apparatus according to claim 13, further comprising an exhaust pipe through which the heat exchange medium is emitted outside.

15. (New) The apparatus according to claim 12, wherein the first gas pipe is located in a top side portion of the process chamber, and the second gas pipe extends from a top side portion of the processing chamber and is located in a top central portion of the processing chamber so as to inject the process gases downward to means for fixing the substrate.

16. (New) The apparatus according to claim 7, wherein the trapezoid-sectional shaped top wall is shaped like a truncated cone.

17. (New) The apparatus according to claim 7, wherein the means for fixing the substrate is connected to a RF power supply to receive a high frequency power of 2 to 4 MHz.

18. (New) The apparatus according to claim 17, wherein the plasma electrode applies a bias voltage with the means for fixing the substrate.

19. (New) The apparatus according to claim 7, wherein each variable capacitor is connected in series with each loop-shaped antenna.